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Farshan Farjani, Esq.
FARJANI & FARJANI LLP
16148 Sand Canyon
Irvine, CA 92618

EXAMINER

WOZNIAK, JAMES S

ART UNIT	PAPER NUMBER
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2655

DATE MAILED: 04/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/940,904

Applicant(s)

GAO, YANG

Examiner

James S. Wozniak

Art Unit

2655

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10/06/2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10-15 and 28-33 is/are allowed.
- 6) ☒ Claim(s) 1-9, 16-27, and 34-41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. In response to the office action from 9/20/2004, the applicant has submitted an amendment, filed 10/6/2004, amending Claims 1-2, 4-5, 10-16, 19-20, 22-23, and 28-34, while arguing to traverse the art rejection based on the limitation regarding the calculation of a pitch enhancement coefficient using a different formula for each of at least two subcodebooks (*Amendment, Page 15*). The applicant's arguments have been fully considered but are moot with respect to the new grounds of rejection in view of Kataoka et al (*U.S. Patent: 5,825,311*).

2. Based on the amendments to **Claim 2**, the examiner has withdrawn the previous objections directed towards minor informalities.

3. Based on the amendments to **Claims 5, 22, and 23**, the examiner has withdrawn the previous 35 U.S.C. 112 Second Paragraph rejection directed towards a lack of antecedent basis.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 1-6, 16-24, and 34-41** are rejected under 35 U.S.C. 103(a) as being unpatentable over Swaminathan et al (U.S. Patent: 5,596,676) in view of Kataoka et al (*U.S. Patent: 5,825,311*).

With respect to **Claims 1 and 19**, Swaminathan recites:

Calculating a pitch enhancement coefficient (*fixed codebook gain index, which would require an inherent calculation step, Col. 21, Line 18- Col. 22, Line 3*);

Providing a fixed codebook comprising at least two fixed subcodebooks (*fixed codebook having two parts, Col. 15, Lines 15-28*);

Selecting one of the at least two fixed subcodebooks (*fixed codebook index, Col. 15, Lines 48-58, and selecting a codebook based on the fixed codebook index at a decoder, Col. 21, Lines 18-48*); and

Applying a pitch enhancement in response to the pitch enhancement coefficient and the one of the at least two fixed subcodebooks (*scaling a fixed codebook vector selected from a subcodebook by an optimum gain factor associated with the vector belonging to a particular subcodebook, Col. 15, Lines 37-47; Col. 21, Lines 18-48*).

Although Swaminathan teaches the use of a gain factor for pitch enhancement, Swaminathan does not specifically suggest how a pitch enhancement is calculated, wherein a different formula is used for each subcodebook, however Kataoka teaches modifying a gain factor for further pitch enhancement by multiplying each gain by a different weight vector associated with each of the gain codebook portions (*Col. 9, Lines 31-61*).

Swaminathan and Kataoka are analogous art because they are from a similar field of endeavor in speech coding. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Swaminathan with the multiplication of two gain vectors by different weighting factors associated with each of the gain codebook portions as taught by Kataoka to provide a means for preventing distortion in speech coding by utilizing optimum weighting coefficient vectors associated with each codebook (*Kataoka, Col. 2, Lines 22-52*).

With respect to **Claims 2 and 20**, Swaminathan discloses:

Applying a pitch enhancement further comprises calculating a pitched-enhanced signal from a codevector selected from the selected fixed subcodebook, a pitch lag, and the pitch enhancement coefficient (*codevector from a fixed codebook, pitch delay from an adaptive codebook, and fixed codebook gain, Col. 21, Lines 18-48*).

With respect to **Claims 3 and 21**, Swaminathan recites:

Calculating the pitch enhancement coefficient based on a pitch gain (*Col. 21, Lines 18-48*).

With respect to **Claims 4 and 22**, Swaminathan recites:

The pitch-enhanced signal is calculated during a search through the subcodebooks (*obtaining a codebook vector, which is scaled by a fixed codebook gain, through a search based on an index, Col. 21, Lines 18-48*).

With respect to **Claims 5 and 23**, Swaminathan discloses:

The pitch-enhanced signal is calculated during an iterative search through the subcodebooks (*obtaining a codebook vector, which is scaled by a fixed codebook gain, through a search based on an index for multiple subframes, Col. 21, Lines 18-48*).

With respect to **Claims 6 and 24**, Swaminathan discloses:

The pitch enhancement coefficient is a mathematical factor from 0.0 to 1.0 (*zero gain, Col. 19, Lines 64- Col. 20, Line 4*).

With respect to **Claims 16 and 34**, Swaminathan discloses:

For a frame classified as type 0, where the steps of selecting a fixed subcodebook and calculating a signal are accomplished by using at least one factor selected from the group consisting of a pitch correlation, a residual sharpness, a noise-to-signal ratio, and a pitch lag (*subframe-based processing and autocorrelation lags, Col. 21, Lines 18-48*).

With respect to **Claims 17 and 35**, Swaminathan recites:

The speech compression system is a selectable mode vocoder (SMV) system (*multi-mode speech encoder, Col. 3, Line 59- Col. 4, Line 4*).

With respect to **Claims 18 and 36**, Swaminathan discloses:

The method is applied to a code-excited linear prediction (CELP) system (*Abstract*).

With respect to **Claim 37**, Swaminathan discloses:

The device is selected from the group consisting of a telephone, a mobile telephone, a cellular telephone, and a portable radio transceiver (*telephone, Col. 3, Lines 19-30*).

With respect to **Claim 38**, Swaminathan recites:

At least one of an encoder and a decoder are provided on a digital signal processor (DSP) chip (*signal processor, Col. 3, Lines 41-58*).

With respect to **Claim 39**, Swaminathan shows:

Communications medium interface operatively connected to provide a bitstream from the encoder to a communications medium (*Fig. 1, Element 17*).

With respect to **Claim 40**, Swaminathan shows:

A signal transformation device to provide speech to the encoder (*Fig. 1, Element 11*).

With respect to **Claim 41**, Swaminathan shows:

The communications medium is one of a radio frequency, a microwave transmission, and an optical transmission (*RF communications medium, Fig. 1, Elements 16 and 17*).

6. **Claims 7-9 and 25-27** are rejected under 35 U.S.C. 103(a) as being unpatentable over Swaminathan et al in view of Kataoka et al, and further in view of Yeldener et al (*U.S. Patent: 5,774,837*).

With respect to **Claims 7 and 25**, Swaminathan in view of Kataoka teaches the speech decoder utilizing a codebook containing multiple subcodebooks, as applied to Claim 1. Swaminathan in view of Kataoka does not specifically suggest applying a pitch enhancement factor forward and backward, however, such a forward/backward pitch adaptation is well known in the art as is evidenced by Yeldener:

The pitch enhancement is applied both forward and backward (*adjusting pitch forward and backward using pitch tracking to improve the perceptual quality of output speech, Col. 12, Lines 26-50*).

Swaminathan, Kataoka, and Yeldener are analogous art because they are from a similar field of endeavor in speech coding. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to combine the method of forward and backward pitch adjustment taught by Yeldener with the speech decoder utilizing a codebook containing multiple subcodebooks taught by Swaminathan in view of Kataoka to provide pitch continuity between

speech frames using forward and backward pitch adjustment, thus obtaining higher quality output speech. Therefore, it would have been obvious to combine Yeldener with Swaminathan in view of Kataoka for the benefit of obtaining pitch continuity between speech frames using forward and backward pitch adjustment.

With respect to **Claims 8 and 26**, Swaminathan further discloses look-ahead and look-back pitch tracking (Col. 6, Lines 16-41), while Yeldener additionally recites the combined forward and backward pitch adjustment as applied to Claims 7 and 25.

With respect to **Claims 9 and 27**, Swaminathan additionally discloses:

Pitch enhancement coefficient is applied to a first power (*fixed codebook gain, which is applied once, Col. 21, Lines 18-48*).

Allowable Subject Matter

7. **Claims 10-15 and 28-33** are allowed.

8. The following is an examiner's statement of reasons for allowance:

The prior art of record fails to explicitly teach or fairly suggest a multi-rate speech coding system featuring a fixed and adaptive codebook, wherein the fixed codebook is divided into two or more subcodebooks with varying pulse formats, that applies a pitch enhancement coefficient to a first power for pulses one pitch lag away from a main pulse and to the second power for pulses two pitch lags away from the main pulse. The prior art of record also does not explicitly teach or fairly suggest the above functions in combination with a pitch enhancement that is

applied forward and backward and is calculated dependent upon a particular subcodebook using a different formula for each subcodebook as shown in Table 1 of the specification.

In addition to the prior art utilized in the above rejections, Taumi et al (U.S. Patent: 5,787,389), teaches a method for applying gain weights based upon a frame delay, however Taumi does not teach nor fairly suggest a pitch gain applied to a first power for pulses that are one pitch lag from a main pulse and applied to a second power or squared for pulses that are two pitch lags from a main pulse.

Since **Claims 11-15 and 29-33** further limit their objected parent claims, these claims are also allowable.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:


Ozawa (*U.S. Patent: 5,797,119*)- teaches a weighting function that varies with a selected gain.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James S. Wozniak whose telephone number is (703) 305-8669 and email is James.Wozniak@uspto.gov. The examiner can normally be reached on Mondays-Fridays, 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Doris To can be reached at (703) 305-4827. The fax/phone number for the Technology Center 2600 where this application is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the technology center receptionist whose telephone number is (703) 306-0377.

James S. Wozniak
3/15/2005


DAVID L. OMETZ
PRIMARY EXAMINER